EMERGENCY MEDICAL SERVICES AGENCY
LOS ANGELES COUNTY

EMS SKILL

AIRWAY EMERGENCY / AIRWAY MANAGEMENT
SUCTIONING - TRACHEOSTOMY TUBE AND STOMA

PERFORMANCE OBJECTIVES
Demonstrate competency in suctioning a patient with a tracheostomy tube while maintaining aseptic technique.

CONDITION
Suction a simulated patient that who has a tracheostomy tube/stoma and has copious secretions and difficulty breathing. Necessary equipment will be adjacent to the manikin or brought to the field setting.

EQUIPMENT
Simulated adult or pediatric tracheostomy manikin, tracheostomy tube (metal/plastic) with an inner cannula, oxygen tank with connecting tubing, T-bar or tracheal mask, suction device with connecting tubing or hand-powered suction device with adaptor, sterile flexible suction catheter, sterile saline irrigation solution, sterile container, sterile saline irrigation vial/ampule and 5cc syringe with removable needle or saline squeeze ampule, pediatric resuscitation, sterile and unsterile gloves, goggles, masks, gown, waste receptacle, timing device.

PERFORMANCE CRITERIA
- Items designated by a diamond (♦) must be performed successfully to demonstrate skill competency.
- Items identified by double asterisks (**) indicate actions that are required if indicated.
- Items identified by (§) should be practiced.
- Ventilations must be at least at the minimum rate required.
- Must maintain aseptic technique.

PREPARATION	
Skill Component	**Key Concepts**
♦ Take body substance isolation precautions	• Mandatory personal protective equipment – gloves
♦ Assess patient for the need to suction tracheal secretions	• Indications for suctioning: noisy respirations, coughing up secretions, respiratory distress or patient request.
♦ Ensure tracheostomy ties are secure	• If ties are not secure, the patient may cough out the tracheostomy tube when suction catheter is inserted or suction is applied.
♦ Ensure suction device is working ** ***Set appropriate suction setting:*** • ***Adult - between 80-120 mmHg*** • ***Pediatric and the elderly - between 50-100mmHg***	• Hand-powered suction devices may be used as long as they have an adaptor for a flexible catheter. • Excessive negative pressures may cause significant hypoxia, damage to tracheal mucosa or lung collapse.
♦ Open suction kit or individual supplies	• Establish and maintain a sterile field. Use the inside of the wrapper to establish field. • Catheter size should not exceed 2 the inner diameter of the airway.
♦ Open/unfold sterile container and fill with irrigation solution	• Sterile saline is used to flush suction catheter as needed. • Depending on kit, container may be under gloves and catheter; this should be removed without contaminating gloves and catheter.

PROCEDURE	
Skill Component	**Key Concepts**
♦ Pre-oxygenate patient - *if indicated*: • Increase Oxygen liter flow to 15 Liters/minute for several breaths **OR** • Ventilate with Bag-valve device 4-5 times	• Pre-oxygenation may be required in patients dependent on O_2 source or if ventilator dependant to offset volume or oxygen loss during suctioning. • Emergent suctioning does not allow time for pre-oxygenation.
♦ Remove oxygen source - *if indicated*	• Patient may or may not be on oxygen and have either a T-bar or tracheal mask for humidification. • Oxygen should be maintained until ready to suction. Flow rate may need to be adjusted to prepare patient for suctioning.

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Skill Component	Key Concepts
♦ Unlock and remove inner cannula - *if indicated*	• Not all trach tubes have inner cannulas. • Sometimes just removing the inner cannula corrects the problem. The cannula may only need to be cleaned and replaced. • The inner cannula does not need to be removed for routine suctioning. However, if the patient is in respiratory distress the inner cannula must be removed in order to avoid pushing thick secretions down the trachea. • The 15mm adaptor that attaches to the BVM device on some trach tubes may be connected to the inner cannula.
♦ Put on sterile gloves	• Sterile gloves are pulled over existing clean gloves.
♦ Connect sterile catheter to suction tubing/device ** ***Keep dominant hand sterile***	• The suction catheter should only be handled with sterile gloves. • Keep catheter in sterile package until ready to use. • Catheter size should be 2 the inner diameter of the trach tube to allow for ease of insertion and air to enter during suctioning.
♦ Suction small amount of irrigation solution to: • Ensure suction device is working • Lubricate tip of catheter	• Lubricating the tip of the catheter with irrigation solution prevents the catheter from adhering to the sides of the trach tube or tracheal mucosa.
♦ Insert catheter into tracheostomy tube/stoma without applying suction	• The patient is not being oxygenated at this time and applying suction depletes oxygen reserves. • If patient has a stoma, suctioning during insertion may damage the lining of the tracheal mucosa.
♦ Advance catheter gently to appropriate level: • Shallow suctioning - opening of trach tube/stoma **OR** • Measured suctioning - length of trach tube **OR** • Deep suctioning - past trach tube to carina	• Shallow/measured suctioning may be all that is needed. Deep suctioning is usually not necessary unless cough is ineffective and airway is not cleared. • Deep suctioning is at the level of the carina which is determined by the catheter meeting resistance during insertion. • The patient may cough or develop bronchospasms when the tip of catheter touches the carina. • Catheter insertion should be accomplished as rapidly as possible since the patient is not oxygenated during this step.
♦ Withdraw catheter slightly before applying suction - *if beyond trach tube*	• Withdrawing the catheter slightly before applying suction prevents damage to the mucosa of the carina.
♦ Suction while withdrawing catheter using a rotating motion and observe patient's response: ** ***Maximum suction time :*** • ***Adults - maximum 10 seconds*** • ***Children – up to 5-10 seconds*** • ***Infants - no longer than 3-5 seconds*** • ***Neonates – no longer than 3 seconds***	• Rotating the catheter prevents the direct suctioning of the tracheal mucosa and suctions secretions from side of the tube. - Roll the catheter between thumb and forefinger for rotating motion. • Suctioning longer than recommended time will result in hypoxia and possibly bradycardia. Maximum suction time depends on patient's age and tolerance. • Patient's response by coughing or grimacing may indicate the catheter is too deep and irritating the tracheal mucosa or carina. May also increase intracranial pressure, tachycardia and hypertension.
♦ Place patient on oxygen or replace oxygen source - *if indicated*	• Patients may need supplemental oxygen after suctioning. • If the patient is ventilator dependent, ventilate the patient with a bag-valve device in between suction attempts.
♦ Evaluate airway patency and heart rate - *repeat procedure if needed* ** ***If secretions are thick and unable to clear tracheostomy tube, instill sterile saline and repeat previous steps*** • Adults 3-5 mL • Peds 1-2 mL	• Observe patient for hypoxemia, dysrhythmias, cyanosis, anxiety, bronchospasms and changes in mental status. • If vagal stimulation occurs, the patient may experience bradycardia, especially pediatric patients. • EMTs & paramedics may instill saline into the trach tube if needed to loosen secretions. However, this procedure poses a great risk for pneumonia and ***should only be done if absolutely necessary***. • Allow patient to rest and regain adequate oxygen levels between suctioning attempts.

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Skill Component	Key Concepts
♦ Suction remaining irrigation solution into collection canister and discard appropriately	• Irrigation solution is contaminated and should be treated the same as secretions.
♦ Discard contaminated catheter: • Coil contaminated catheter around sterile (dominant) hand and pull glove over catheter • Pull glove from other hand over packaged catheter and discard in approved waste receptacle	

REPLACE INNER CANNULA

Skill Component	Key Concepts
♦ Check for spare or clean the inner cannula - *if needed*	• Some patients have a spare inner cannula at the bedside. • If the inner cannula needs to be cleaned, this can be done by the rescuer, caregiver or partner. • Procedure for cleaning the inner cannula: - rinse the inner cannula with saline - suction or use a pipe cleaner to remove secretions - gently tap the cannula to remove excess solution before reinsertion
♦ Remove oxygen source	
♦ Evaluate response to treatment	
♦ Evaluate results of reassessment and note any changes in patient's condition and vital signs ***Manage patient's condition as indicated.***	• Comparing results assists in recognizing if the patient is improving, responding to treatment or condition is deteriorating.

INSTILLATION OF SALINE

Saline is only instilled if absolutely necessary

Skill Component	Key Concepts
§ Prepare saline irrigation solution - *if indicated* • Check saline for: - drug name - integrity of container/medication - concentration/dose - clarity - expiration date • Twist off top of saline irrigation vial /ampule **OR** • Prepare a syringe with 5cc normal saline and remove needle - *if within scope of practice*	• EMTs & paramedics may instill saline into the trach tube if needed to loosen secretions. However, this procedure poses a great risk for pneumonia and ***should only be done if absolutely necessary***. • Each patient must be evaluated early to determine the need for irrigation to loosen secretions. • EMTs & paramedics may use prepared saline irrigation vial /ampule. *Caution - the rescuer must ensure that the vial/ampule contains saline and not a medication such as albuterol.* • Paramedics may use a syringe to draw up saline and after removing needle instill into the trach tube.
§ Instill 1-5mL of sterile saline down tracheostomy tube • 3-5mL for adults • 1-2 mL for pediatric patients	• Amount of saline instilled depends on patient's age and tolerance. • Pediatric patients falling into any color zone on the pediatric resuscitation tape should have only 1-2 mL of solution instilled and those longer than the pediatric resuscitation tape may tolerate 3-5 mL of solution.
§ Repeat suction procedure	

REASSESSMENT (Ongoing Assessment)	
Skill Component	**Key Concepts**
§ Assess airway, breathing and heart rate: • Continuously or every 5 minutes or sooner • Changes in airway sounds • Changes in respiratory status	• If vagal stimulation occurs, the patient may experience bradycardia, especially pediatric patients.
♦ Evaluate response to treatment	
♦ Evaluate results of reassessment and note any changes in patient's condition and vital signs ***Manage patient's condition as indicated.***	• Comparing results assists in recognizing if the patient is improving, responding to treatment or condition is deteriorating.

PATIENT REPORT AND DOCUMENTATION	
Skill Component	**Key Concepts**
§ Verbalize/Document • Indication for suctioning • Oxygen liter flow • Patient's tolerance of procedure • Problems encountered • Type of secretions: - color - consistency - quantity - odor • Respiratory assessment and heart rate: - respiratory rate - effort/quality - tidal volume - lung sounds	• Documentation must be on either the Los Angeles County EMS Report form or departmental Patient Care Record form. • Documenting reassessment information provides a comprehensive picture of patient's response to treatment. • Last reassessment information (before patient care is transferred) should be documented in the section of the EMS form that is called "Reassessment after Therapies and/or Condition on Transfer".

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Developed: 10/02 Revised: 1/05, 1/10, 6/10

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SUCTIONING - TRACHEOSTOMY TUBE AND STOMA
Supplemental Information

DEFINITIONS:

- Inner cannula - a Asleeve@ which fits inside the tracheostomy tube and may be removed for cleaning
- Pre-oxygenation - increasing oxygen liter flow for a brief period of time or ventilating the patient 3-4 times with a bag-valve device to increase the blood oxygen level
- Tracheotomy - a surgical incision into the trachea to establish an airway that may be temporary or permanent
- Tracheostomy - a tracheal stoma (opening) that results from a tracheotomy
- Tracheostomy tube - a plastic or metal tube inserted below the 2nd or 3rd tracheal ring bypassing the epiglottis

INDICATIONS: To maintain a patent airway in patients with a tracheostomy tube or stoma.

- Gurgling mucus sound from tracheostomy (noisy respirations)
- Bubbles of mucus in trach
- Coughing up secretions
- Patient requests to be suctioned
- Respiratory distress due to airway obstruction.

COMPLICATIONS:

- Hypoxia
- Bronchospasms
- Tracheal trauma
- Infection/sepsis
- Cardiac irritation (dysrhythmias) due to decreased myocardial oxygenation
- Tachycardia, hypertension, intracranial pressure due to coughing and gagging
- Bradycardia and hypotension due to vagal stimulation
- Cardiac arrest

NOTES:

- Aseptic technique must be maintained throughout suctioning procedure to prevent infection.
- Ensure that ties holding the tracheostomy tube in place are secure.
- Excessive suctioning should be avoided to decrease potential for tracheal damage and increase in mucus production.
- Catheter size should not exceed **2** the inner diameter of the airway. Larger catheters may cause suction-induced hypoxia, lung collapse and damage to tracheal tissues.
- Establish and maintain a sterile field. Use the inside of the wrapper to establish field for equipment.
- Hand-operated vacuum suction devices may be used as long as they have an adaptor for a flexible catheter.
- Keep suction setting between 80-120 mmHg and adjust setting lower for pediatric and elderly patients (50-100 mmHg). Excessive negative pressures may cause significant hypoxia, damage to tracheal mucosa or lung collapse. Too little suction is ineffective.
- Pre-oxygenation may be required depending on patient=s condition. This offsets volume and oxygen loss during suctioning.
- Patient may or may not be on oxygen and have either a T-bar or tracheal mask for humidification.
- Oxygen should be maintained until ready to suction. Flow rate may need to be adjusted to prepare patient for suctioning.
- Rotating the catheter prevents the direct suctioning of the tracheal mucosa. Roll the catheter between thumb and forefinger for rotating motion.
- Suctioning longer than recommended time will result in hypoxia, and cardiac complications. Maximum suction time depends on patient=s age and tolerance and is timed from when suction is applied:
  - Adults - maximum 10 seconds
  - Children - maximum of 5-10 seconds
  - Infants - no longer than 5 seconds
- Saline solutions vs. water for suctioning and irrigation of tracheostomy. Saline solutions for irrigation is Sodium Chloride (NaCl), a solution of 9 grams of NaCl dissolved in 1 liter of water which is a close approximation to the osmolarity of NaCl in blood and does not destroy delicate tissue and is easily absorbed by the body. Water is a hypotonic solution and may cause osmotic lyses of cells. Water diffuses into the cells and when the cell volume exceeds the cell capacity it will burst.

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Inner Cannulas:

- Not all tracheostomy tubes have inner cannulas.
- Sometimes just removing the inner cannula corrects the problem. The cannula may only need to be cleaned and replaced.
- The inner cannula does not need to be removed for routine suctioning. However, if the patient is in respiratory distress the inner cannula must be removed in order not to push the thick secretions back down the trachea and to open the airway immediately.
- Procedure for cleaning the inner cannula:
  - Rinse the inner cannula with saline by dipping the cannula into solution and tipping cannula upside-down to allow solution to run through it.
  - Suction or use a pipe cleaner (if available) to remove secretions.
  - Gently tap the cannula to remove excess solution before reinsertion.

Saline Instillation:

- Instilling saline into the tracheostomy tube does NOT liquefy or loosen tenacious secretions by breaking the mucus bond. The only effect instillation of saline has is to make the patient cough strongly and thus loosen secretions.
- EMTs & paramedics may instill saline into the tracheostomy tube if needed to loosen secretions. However, this procedure poses a great risk for pneumonia and ***should only be done if absolutely necessary***.
- Each patient must be evaluated early to determine the need for irrigation to thin or loosen secretions.
- EMTs & paramedics may use the prepared saline irrigation vial/ampule. *Caution - the rescuer must ensure that the vial /ampule contains saline and not a medication such as albuterol.* Paramedics may use a syringe to draw up saline and instill into the tracheostomy tube after removing the needle.
- Instill 1-5mL of sterile saline down tracheostomy tube. Amount of saline instilled depends on patient's age and tolerance: 3-5mL for adults and 1-2 mL for pediatric patients

  ****** Pediatric patients falling into a color zone on the pediatric resuscitation tape should have only 1-2 mL of solution instilled. Those longer than the pediatric resuscitation tape may tolerate 3-5 mL of solution.

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